

Analytical Data Package Prepared For

Fluor Hanford Inc.

Radiochemical Analysis By

STL Richland*2800 G.W. Way, Richland Wa, 99352, (509)-375-3131.*

Assigned Laboratory Code: STLRL

Data Package Contains 23 Pages

Report No.: 28307

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
<u>W04578</u>	F05-009	B1CF66	J5C040307-1	G5K031AE	9G5K0310	5066493
		B1CF66	J5C040307-1	G5K031AC	9G5K0310	5066497





Certificate of Analysis

Fluor Hanford
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Richland, WA 99352

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March 18, 2005

Attention: Steve Trent

SAF Number	:	F05-009
Date SDG Closed	:	March 7, 2005
Number of Samples	:	One (1)
Sample Type	:	Water
SDG Number	:	W04578
Data Deliverable	:	7-Day / 15-Day Summary

CASE NARRATIVE

I. Introduction

On March 4, 2005, one water sample was received at STL Richland (STLR) for radiochemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the Fluor Hanford (FH) specific ID:

<u>FH ID#</u>	<u>STLR ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
B1CF66	G5K03	WATER	3/4/05

II. Sample Receipt

The samples were received in good condition and no anomalies were noted during check-in. The Total Uranium analysis was cancelled for this SAF on 3/4/05 per Steve Trent.

III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analysis was:

Alpha Spectroscopy
Uranium-234, -235, -238 by method RUCH-RC-5067
Liquid Scintillation Counting
Technetium-99 by method RICH-RC-5078

IV. Quality Control

The analytical results for each analysis performed under SDG W04578 includes a minimum of one laboratory control sample (LCS), one method (reagent) blank, and one duplicate sample analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

V. Comments

Alpha Spectroscopy

Uranium-234, -235, -238 by method RUCH-RC-5067:

The LCS, batch blank, sample and sample duplicate (B1CF66) results are within contractual requirements.

Liquid Scintillation Counting

Technetium-99 by method RICH-RC-5078:

The LCS, batch blank, sample, sample duplicate (B1CF66) and sample matrix spike (B1CF66) results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a designee as verified by the following signature.

Reviewed and approved:

for 
Becky Warrington
Project Manager

Drinking Water Method Cross References

DRINKING WATER ASTM METHOD CROSS REFERENCES		
Referenced Method	Isotope(s)	STL Richland's SOP number
EPA 901.1	Cs-134, I-131	RICH-RC-5017
EPA 900.0	Alpha & Beta	RICH-RC-5014
EPA 903.1	Ra-226	RICH-RC-5005
EPA 904.0	Ra-228	RICH-RC-5005
EPA 905.0	Sr89/90	RICH-RC-5006
ASTM D2460	Total Radium	RICH-RC-5027
Standard Method 7500-U-C & ASTM D5174	Uranium	RICH-RC-5058
EPA 906.0	Tritium	RICH-RC-5007
NOTE:		
The Gross Alpha LCS is prepared with Am-241 (unless otherwise specified in the case narrative)		
The Gross Beta LCS is prepared with Sr/Y-90 (unless otherwise specified in the case narrative)		

Uncertainty Estimation

STL Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, $R = \text{constants} * f(x,y,z,...)$. The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties (u_i) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty (u_c) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value (S/\sqrt{n}), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

Report Definitions

Action Lev	An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit.
Batch	The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together.
Bias	Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30.
COC No	Chain of Custody Number assigned by the Client or STL Richland.
Count Error (#s)	Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background.
Total Uncert (#s) <i>u_c - Combined Uncertainty.</i>	All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result, <i>u_c the combined uncertainty</i> . The uncertainty is absolute and in the same units as the result.
(#s), Coverage Factor	The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations.
CRDL (RL)	Contractual Required Detection Limit as defined in the Client's Statement Of Work or STL Richland "default" nominal detection limit. Often referred to the reporting level (RL)
Lc	Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. $Lc = (1.645 * \text{Sqrt}(2 * (\text{BkgndCnt}/\text{BkgndCntMin}) / \text{SCntMin})) * (\text{ConvFct}/(\text{Eff} * \text{Yld} * \text{Abn} * \text{Vol})) * \text{IngrFct}$. For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero.
Lot-Sample No	The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot.
MDC MDA	Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. $MDC = (4.65 * \text{Sqrt}((\text{BkgndCnt}/\text{BkgndCntMin}) / \text{SCntMin}) + 2.71 / \text{SCntMin}) * (\text{ConvFct}/(\text{Eff} * \text{Yld} * \text{Abn} * \text{Vol})) * \text{IngrFct}$. For LSC methods the batch blank is used as a measure of the background variability.
Primary Detector	The instrument identifier associated with the analysis of the sample aliquot.
Ratio U-234/U-238	The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038.
Rst/MDC	Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Rst/TotUcert	Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Report DB No	Sample Identifier used by the report system. The number is based upon the first five digits of the Work Order Number.
RER	The equation Replicate Error Ratio = $(S-D)/[\text{sqrt}(\text{TPUs}^2 + \text{TPUD}^2)]$ as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUD is the total uncertainty of the duplicate sample.
SDG	Sample Delivery Group Number assigned by the Client or assigned by STL Richland upon sample receipt.
Sum Rpt Alpha Spec Rst(s)	The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units.
Work Order	The LIMS software assign test specific identifier.
Yield	The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method.

Sample Results Summary

Date: 18-Mar-05

STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 28307

SDG No: W04578

Batch	Client Id Work Order	Parameter	Result +/- Uncertainty (2s)	Qual	Units	Yield	MDC or MDA	CRDL	RPD
5066493 KWSR									
	B1CF66								
	G5K031AE	U-234	8.22E+00 +/- 5.89E+00		pCi/g	83%	4.90E-01	1.00E+00	
		U-235	1.86E-01 +/- 2.81E-01	U	pCi/g	83%	4.03E-01	1.00E+00	
		U-238	7.95E+00 +/- 5.70E+00		pCi/g	83%	4.51E-01	1.00E+00	
	B1CF66 DUP								
	G5K031AG	U-234	6.22E+00 +/- 4.39E+00		pCi/g	83%	3.39E-01	1.00E+00	27.7
		U-235	4.11E-01 +/- 4.45E-01	U	pCi/g	83%	3.39E-01	1.00E+00	75.5
		U-238	8.95E+00 +/- 6.23E+00		pCi/g	83%	4.47E-01	1.00E+00	11.9
5066497 TC99_ETVDSK_LSC									
	B1CF66								
	G5K031AC	TC-99	-3.15E+00 +/- 7.44E+00	U	pCi/g	100%	1.31E+01	1.50E+01	
	B1CF66 DUP								
	G5K031AJ	TC-99	1.63E+00 +/- 7.68E+00	U	pCi/g	100%	1.30E+01	1.50E+01	-628.6
No. of Results: 8									

STL Richland RPD - Relative Percent Difference.

rptSTLRichSaSummary2 V4.11 A97 U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

QC Results Summary

Date: 18-Mar-05

STL Richland STLRL

Ordered by Method, Batch No, QC Type,.

Report No. : 28307

SDG No.: W04578

Batch	Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Yield	Recovery	Bias	MDC MDA
KWSR									
5066493 BLANK QC									
	G5PCR1AA	U-234	-4.34E-03 +- 8.70E-03	U	pCi/g	82%			3.47E-02
		U-235	-3.61E-03 +- 3.29E-03	U	pCi/g	82%			2.66E-02
		U-238	2.16E-03 +- 1.09E-02	U	pCi/g	82%			2.97E-02
5066493 LCS									
	G5PCR1AC	U-234	1.66E+00 +- 3.23E-01		pCi/g	90%	101%	0.0	2.89E-02
		U-238	1.61E+00 +- 3.15E-01		pCi/g	90%	94%	-0.1	3.34E-02
TC99_ETVDSK_LSC									
5066497 MATRIX SPIKE									
	G5K031AH	TC-99	3.42E+03 +- 2.02E+02		pCi/g	100%	75%	-0.2	1.30E+01
5066497 BLANK QC									
	G5PCW1AA	TC-99	-2.39E-02 +- 3.80E-01	U	pCi/g	100%			6.61E-01
5066497 LCS									
	G5PCW1AC	TC-99	1.84E+02 +- 1.09E+01		pCi/g	100%	81%	-0.2	6.50E-01
No. of Results: 8									

STL Richland Bias - (Result/Expected)-1 as defined by ANSI N13.30.

rptSTLrchQcSummary V4.11 A97 U Qual - Analyzed for, but the result is less than the Mdc/Mda/Total Uncert or gamma scan software did not identify the nuclide.

FORM I
SAMPLE RESULTS

Date: 18-Mar-05

Lab Name: STL Richland

SDG: W04578

Collection Date: 3/4/2005 8:20:00 AM

Lot-Sample No.: J5C040307-1

Report No.: 28307

Received Date: 3/4/2005 12:55:00 PM

Client Sample ID: B1CF66

COC No.: F05-009-080

Matrix: SOIL

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 5066493	KWSR			Work Order: G5K031AE			Report DB ID: 9G5K0310					
U-234	8.22E+00			5.89E+00	4.90E-01	pCi/g	83%	(16.8)	3/18/05 10:23 a		0.1035	ALP1
							1.49E-01	1.00E+00			G	
U-235	1.86E-01	U		2.81E-01	4.03E-01	pCi/g	83%	0.46	3/18/05 10:23 a		0.1035	ALP1
							1.05E-01	1.00E+00			G	
U-238	7.95E+00			5.70E+00	4.51E-01	pCi/g	83%	(17.7)	3/18/05 10:23 a		0.1035	ALP1
							1.29E-01	1.00E+00			G	
Ratio U-234/238 = 1.0												
Batch: 5066497	TC99_ETVDSK_LSC			Work Order: G5K031AC			Report DB ID: 9G5K0310					
TC-99	-3.15E+00	U	5.28E+00	7.44E+00	1.31E+01	pCi/g	100%	-0.24	3/17/05 10:38 p		0.1	LSC4
							6.28E+00	1.50E+01			G	

No. of Results: 4

Comments:

STL Richland MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
rptSTLRchSample U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.
V4.11 A97

FORM II

Date: 18-Mar-05

DUPLICATE RESULTS

Lab Name: STL Richland

SDG: W04578

Collection Date: 3/4/2005 8:20:00 AM

Lot-Sample No.: J5C040307-1

Report No.: 28307

Received Date: 3/4/2005 12:55:00 PM

Client Sample ID: B1CF66 DUP

COC No.: F05-009-080

Matrix: SOIL

Parameter	Result, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA, Action Lev	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 5066493	KWSR				Work Order: G5K031AG	Report DB ID: G5K031GR			Orig Sa DB ID: 9G5K0310			
U-234	6.22E+00			4.39E+00	3.39E-01	pCi/g	83%	(18.3)	3/18/05 10:23 a		0.1065	ALP2
	8.22E+00			RPD 27.7		1.00E+00		(2.8)			G	
U-235	4.11E-01	U		4.45E-01	3.39E-01	pCi/g	83%	(1.2)	3/18/05 10:23 a		0.1065	ALP2
	1.88E-01	U		RPD 75.5		1.00E+00		(1.8)			G	
U-238	8.95E+00			6.23E+00	4.47E-01	pCi/g	83%	(20.)	3/18/05 10:23 a		0.1065	ALP2
	7.95E+00			RPD 11.9		1.00E+00		(2.9)			G	
Ratio U-234/238 = 0.7										Alpha Spec Result Sum = 1.6E+01		
Batch: 5066497	TC99_ETVDSK_LSC				Work Order: G5K031AJ	Report DB ID: G5K031JR			Orig Sa DB ID: 9G5K0310			
TC-99	1.63E+00	U	5.44E+00	7.68E+00	1.30E+01	pCi/g	100%	0.12	3/18/05 12:42 a		0.1	LSC4
	-3.15E+00	U		RPD -628.6		1.50E+01		0.42			G	
										Alpha Spec Result Sum = 1.6E+01		

No. of Results: 4 Comments:

STL Richland RPD - Relative Percent Difference.

rptSTLRchDupV4.1 MDC|MDA, Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

1 A97 U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM II
BLANK RESULTS

Date: 18-Mar-05

Lab Name: STL Richland

Matrix: SOIL

SDG: W04578

Report No. : 28307

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 5066497	TC99_ETVDSK_LSC				Work Order: G5PCW1AA	Report DB ID: G5PCW1AB						
TC-99	-2.39E-02	U	2.70E-01	3.80E-01	6.61E-01	pCi/g	100%	-0.04	3/18/05 01:45 a		2.0	LSC4
					3.18E-01	2.00E+01		-0.13			G	
Batch: 5066493	KWSR				Work Order: G5PCR1AA	Report DB ID: G5PCR1AB						
U-234	-4.34E-03	U		8.70E-03	3.47E-02	pCi/g	82%	-0.13	3/18/05 10:24 a		2.0	ALP3
					1.25E-02	1.00E+00		-1.			G	
U-235	-3.61E-03	U		3.29E-03	2.66E-02	pCi/g	82%	-0.14	3/18/05 10:24 a		2.0	ALP3
					8.40E-03	1.00E+00		-(2.2)			G	
U-238	2.16E-03	U		1.09E-02	2.97E-02	pCi/g	82%	0.07	3/18/05 10:24 a		2.0	ALP3
					9.94E-03	1.00E+00		0.4			G	
Ratio U-234/238 = -2.0												

No. of Results: 4

Comments:

STL Richland
rptSTLRchBlank
V4.11 A97

MDC|MDA, Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM II
LCS RESULTS

Date: 18-Mar-05

Lab Name: STL Richland

SDG: W04578

Matrix: SOIL

Report No. : 28307

Parameter	Result	Count Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 5066497	TC99_ETVDSK_LSC												
	TC-99		1.84E+02	1.86E+00	1.09E+01	6.50E-01 pCi/g	100%	2.28E+02	2.89E+00	81%	3/18/05 02:47 a	2.0	LSC4
							Rec Limits:	70	130	-0.2		G	
Batch: 5066493	KWSR												
	U-234		1.66E+00		3.23E-01	2.89E-02 pCi/g	90%	1.64E+00	1.01E-02	101%	3/18/05 10:24 a	2.0	ALP4
							Rec Limits:	20	105	0.0		G	
	U-238		1.61E+00		3.15E-01	3.34E-02 pCi/g	90%	1.72E+00	1.05E-02	94%	3/18/05 10:24 a	2.0	ALP4
							Rec Limits:	20	105	-0.1		G	
No. of Results: 3		Comments:											

STL Richland Bias - (Result/Expected)-1 as defined by ANSI N13.30.

rptSTLRchLcs
V4.11 A97

FORM II
MATRIX SPIKE RESULTS

Date: 18-Mar-05

Lab Name: STL Richland

SDG: W04578

Lot-Sample No.: J5C040307-1

Report No.: 28307

Matrix: SOIL

Parameter	SpikeResult, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA	Rpt Unit, CRDL	Yield	Rec- overy	Exp- ected	Exp Uncert	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 5066497	TC99_ETVDSK_LSC				Work Order: G5K031AH	Report DB ID: G5K031HW				Orig Sa DB ID: 9G5K0310			
TC-99	3.42E+03		3.58E+01	2.02E+02	1.30E+01	pCi/g	100%	75.07%	4.56E+03	1.78E+0	3/17/05 11:40 p	0.1	LSC4
	-3.15E+00	RPD	33.9									G	
No. of Results: 1		Comments:											

STL Richland RER - Replicate Error Ratio = $(S-D)/[\sqrt{sq(TPUs)+sq(TPUD)}]$ as defined by ICPT BOA.
 rptSTLRchMs Bias - (Result/Expected)-1 as defined by ANSI N13.30.
 V4.11 A97

**STL****Data Review/Verification Checklist**
RADIOCHEMISTRY, First Level Review

3/18/2005 2:06:05 PM

Lot No., Due Date: J5C040307; 03/18/2005
Client, Site: 108302; FLUOR- SOILS Hanford Site
QC Batch No., Method Test: 5066493; RUI SO Uiso by ALP
SDG, Matrix: W04578; SOIL

1.0 COC

1.1 Is the ICOC page complete; includes all applicable analysis, dates, SOP numbers, and revisions?

Yes No N/A

☒**2.0 QC Batch**

2.1 Do the Summary/Detailed Reports include a calculated result for each sample listed on the QC Batch Sheet?

Yes No N/A

☒

2.2 Are the QC appropriate for the analysis included in the batch?

Yes No N/A

☒

2.3 Is the Analytical Batch Worksheet complete; includes as appropriate, volumes, count times, etc?

Yes No N/A

☒

2.4 Does the Worksheets include a Tracer Vial label for each sample?

Yes No N/A

☒**3.0 QC & Samples**

3.1 Is the blank results, yield, and MDA within contract limits?

Yes No N/A

☒

3.2 Is the LCS result, yield, and MDA within contract limits?

Yes No N/A

☒

3.3 Are the MS/MSD results, yields, and MDA within contract limits?

Yes No N/A

☒

3.4 Are the duplicate result, yields, and MDAs within contract limits?

Yes No N/A

☒

3.5 Are the sample yields and MDAs within contract limits?

Yes No N/A

☒**4.0 Raw Data**

4.1 Were results calculated in the correct units?

Yes No N/A

☒

4.2 Were analysis volumes entered correctly?

Yes No N/A

☒

4.3 Were Yields entered correctly?

Yes No N/A

☒

4.4 Were spectra reviewed/meet contractual requirements?

Yes No N/A

☒

4.5 Were raw counts reviewed for anomalies?

Yes No N/A

☒**5.0 Other**

5.1 Are all nonconformances included and noted?

Yes No N/A

☒

5.2 Are all required forms filled out?

Yes No N/A

☒

5.3 Was the correct methodology used?

Yes No N/A

☒

5.4 Was transcription checked?

Yes No N/A

☒

5.5 Were all calculations checked at a minimum frequency?

Yes No N/A

☒

5.6 Are worksheet entries complete and correct?

Yes No N/A

☒

6.0 Comments on any No response:

The dup for U234 is out 28%. The matrix is soil an inconsistent matrix.

N/A 5579 U5/18/05
RPD is within limits for soil/matrix.

First Level Review

Date

3-18-05

STL Richland

QAS_RADCALCv4.8.09

Page 1



STL

Data Review Checklist
RADIOCHEMISTRY
Second Level Review

QC Batch Number: 5064493

Review Item	Yes (✓)	No (✓)	N/A (✓)
A. Sample Analysis			
1. Are the sample yields within acceptance criteria?	✓		
2. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓		
3. Are the correct isotopes reported?	✓		
B. QC Samples			
1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓		
2. Does the blank result meet the Contract criteria?	✓		
3. Is the blank result < the Contract Detection Limit?	✓		
4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓
5. Is the LCS recovery with contract acceptance criteria?	✓		
7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓		
8. Do the MS/MSD results and yields meet acceptance criteria?			✓
9. Do the duplicate sample results and yields meet acceptance criteria?	✓		
C. Other			
1. Are all Nonconformances included and noted?			✓
2. Are all required forms filled out?	✓		
3. Was the correct methodology used?	✓		
4. Was transcription checked?	✓		
5. Were all calculations checked at a minimum frequency?	✓		
6. Were units checked?	✓		

Comments on any "No" response: _____

Second Level Review: _____

Date: 3/18/05

**STL****Data Review/Verification Checklist**
RADIOCHEMISTRY, First Level Review

3/18/2005 2:25:56 PM

Lot No., Due Date: J5C040307; 03/18/2005
Client, Site: 108302; FLUOR- SOILS Hanford Site
QC Batch No., Method Test: 5066497; RTC99 Tc-99 by LSC
SDG, Matrix: W04578; SOIL

1.0 COC

1.1 Is the ICOC page complete; Includes all applicable analysis, dates, SOP numbers, and revisions?

Yes No N/A
☒ ☐ ☐**2.0 QC Batch**

2.1 Do the Summary/Detailed Reports include a calculated result for each sample listed on the QC Batch Sheet?

Yes No N/A
☒ ☐ ☐

2.2 Are the QC appropriate for the analysis included in the batch?

Yes No N/A
☒ ☐ ☐

2.3 Is the Analytical Batch Worksheet complete; includes as appropriate, volumes, count times, etc?

Yes No N/A
☒ ☐ ☐

2.4 Does the Worksheets include a Tracer Vial label for each sample?

Yes No N/A
☒ ☐ ☒**3.0 QC & Samples**

3.1 Is the blank results, yield, and MDA within contract limits?

Yes No N/A
☒ ☐ ☐

3.2 Is the LCS result, yield, and MDA within contract limits?

Yes No N/A
☒ ☐ ☐

3.3 Are the MS/MSD results, yields, and MDA within contract limits?

Yes No N/A
☒ ☐ ☐

3.4 Are the duplicate result, yields, and MDAs within contract limits?

Yes No N/A
☒ ☐ ☐

3.5 Are the sample yields and MDAs within contract limits?

Yes No N/A
☒ ☐ ☐**4.0 Raw Data**

4.1 Were results calculated in the correct units?

Yes No N/A
☒ ☐ ☐

4.2 Were analysis volumes entered correctly?

Yes No N/A
☒ ☐ ☐

4.3 Were Yields entered correctly?

Yes No N/A
☒ ☐ ☒

4.4 Were spectra reviewed/meet contractual requirements?

Yes No N/A
☒ ☐ ☒

4.5 Were raw counts reviewed for anomalies?

Yes No N/A
☒ ☐ ☐**5.0 Other**

5.1 Are all nonconformances included and noted?

Yes No N/A
☒ ☐ ☒

5.2 Are all required forms filled out?

Yes No N/A
☒ ☐ ☐

5.3 Was the correct methodology used?

Yes No N/A
☒ ☐ ☐

5.4 Was transcription checked?

Yes No N/A
☒ ☐ ☐

5.5 Were all calculations checked at a minimum frequency?

Yes No N/A
☒ ☐ ☐

5.6 Are worksheet entries complete and correct?

Yes No N/A
☒ ☐ ☐

6.0 Comments on any No response:

First Level Review

Date 3-18-05

STL Richland

QAS_RADCALCv4.8.09

Page 1



STL

Data Review Checklist
RADIOCHEMISTRY
Second Level Review

QC Batch Number: 5066497

Review Item	Yes (✓)	No (✓)	N/A (✓)
A. Sample Analysis			
1. Are the sample yields within acceptance criteria?			✓
2. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓		
3. Are the correct isotopes reported?	✓		
B. QC Samples			
1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓		
2. Does the blank result meet the Contract criteria?	✓		
3. Is the blank result < the Contract Detection Limit?	✓		
4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓
5. Is the LCS recovery with contract acceptance criteria?	✓		
7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓		
8. Do the MS/MSD results and yields meet acceptance criteria?	✓		
9. Do the duplicate sample results and yields meet acceptance criteria?	✓		
C. Other			
1. Are all Nonconformances included and noted?			✓
2. Are all required forms filled out?	✓		
3. Was the correct methodology used?	✓		
4. Was transcription checked?	✓		
5. Were all calculations checked at a minimum frequency?	✓		
6. Were units checked?	✓		

Comments on any "No" response: _____

Second Level Review: Jacqui Waddell Date: 3/18/05

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F05-009-080		PAGE 1 OF 1			
COLLECTOR POPE/PFISTER/MOKLER/TYRA		COMPANY CONTACT JACKSON, RL		TELEPHONE NO. 372-9004		PROJECT COORDINATOR TRENT, SJ		PRICE CODE 88			
SAMPLING LOCATION <i>04722</i> 216-U-B ; <i>04722 44ft - 46ft</i>		PROJECT DESIGNATION U Plant Closure Contaminant Plume Refinement				SAF NO. F05-009		DATA TURNAROUND 7 Days / 15 Days			
ICE CHEST NO. <i>0-50639</i>		FIELD LOGBOOK NO. <i>HNF-U-429</i>		COA 119141ES10		METHOD OF SHIPMENT GOVERNMENT VEHICLE		AIR QUALITY <input type="checkbox"/>			
SHIPPED TO Severn Trent Incorporated, Richland		OFFSITE PROPERTY NO. N/A				BILL OF LADING/AIR BILL NO. N/A					
MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other		POSSIBLE SAMPLE HAZARDS/ REMARKS <i>J5C040307</i> <i>SDG# W04569</i> <i>Due 3/11/05</i>		PRESERVATION None		TYPE OF CONTAINER 9G		NO. OF CONTAINER(S) 1		VOLUME 60mL	
		SPECIAL HANDLING AND/OR STORAGE		SAMPLE ANALYSIS Isotopic Uranium; Technetium-99; Total Uranium;							
SAMPLE NO.		MATRIX*		SAMPLE DATE		SAMPLE TIME					
B1CF66		SOIL		3/4/05		0820		X		GSK08	
CHAIN OF POSSESSION				SIGN/ PRINT NAMES				SPECIAL INSTRUCTIONS			
RELINQUISHED BY/REMOVED FROM <i>DAPE/8-4-05</i>		DATE/TIME <i>1255</i>		RECEIVED BY/STORED IN <i>DAPE/8-4-05</i>		DATE/TIME <i>1255</i>		<i>5.5</i> The STL-RL laboratory is to achieve a detection limit of 1 pCi/gm for Tc-99. The STL laboratories will close SDGs upon accumulation of 5 samples or at a minimum weekly.			
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME					
LABORATORY SECTION		RECEIVED BY				TITLE				DATE/TIME	
FINAL SAMPLE DISPOSITION		DISPOSAL METHOD				DISPOSED BY				DATE/TIME	



STL

Sample Check-in List

Date/Time Received: 3/04/05 @ 12:55 AM
Client: FLH SDG #: W04569 NA ☐ SAF #: F05-009 NA ☐
Work Order Number: USC040307 Chain of Custody #: F05-009-080
Shipping Container ID: N/A Air Bill #: N/A

1. Custody Seals on shipping container intact? NA ☐ Yes ☒ No ☐
2. Custody Seals dated and signed? NA ☐ Yes ☒ No ☐
3. Chain of Custody record present? Yes ☐ No ☒
4. Cooler temperature: NA 5. Vermiculite/packing materials is NA ☐ Wet ☐ Dry ☒
6. Number of samples in shipping container: 1
7. Sample holding times exceeded? NA ☒ Yes ☐ No ☐
8. Samples have:
☐ tape ☐ hazard labels
☒ custody seals ☒ appropriate samples labels
9. Samples are:
☐ in good condition ☐ leaking
☐ broken ☐ have air bubbles
(Only for samples requiring head space)
10. Sample pH taken? NA ☒ pH < 2 ☐ pH > 2 ☐ pH > 9 ☐
11. Sample Location, Sample Collector Listed? * Yes ☐ No ☒
*For documentation only. No corrective action needed.
12. Were any anomalies identified in sample receipt? Yes ☐ No ☒
13. Description of anomalies (include sample numbers): _____

Sample Custodian: [Signature] Date: 3/04/05






Client Sample ID	Analysis Requested	Condition	Comments/Action

Client Informed on _____ by _____ Person contacted _____

☐ No action necessary; process as is.

Project Manager _____ Date _____

LS-023, 9/03, Rev. 5

3/10/2005 4:48:04 PM		Sample Preparation/Analysis				Balance Id: 1120373922				
108302, FLUOR HANFORD IC Hanford Inc		, Flour		KW Uiso PrpRC5013/5032/5086 SepRC5067(5039)		Pipet #: _____				
Report Due: 03/18/2005		SR Uranium-234,235,238 by Alpha Spec		PRIORITY		Sep1 DT/Tm Tech: _____				
Batch: 5066493 SOIL		pCi/g		PM, Quote: BG2, 50639		Sep2 DT/Tm Tech: _____				
SEQ Batch, Test: None						Prep Tech: HansenM				
										
Work Order, Lot, Sample Date/Time	Total Amt/Unit	Initial Aliquot Amt/Unit	QC Tracer Prep Date	Dish Size	Ppt or Geometry	Count Time Min	Detector Id	Count On Off (24hr) Circle	CR Analyst, Init/Date	Comments:
1 GSK03-1-AE J5C040307-1-SAMP 	0.1035g, in	UIC12571 01/31/05, pd 10/12/04, r								
03/04/2005 08:20		AmtRec: 60MLG	#Containers: 1					Scr Rst: Alpha: 2.63E+03 pCi/g	Beta: 7.90E+02 pCi/g	
2 GSK03-1-AG-X J5C040307-1-DUP 	0.1065g, in	UIC12572 01/31/05, pd 10/12/04, r								
03/04/2005 08:20		AmtRec: 60MLG	#Containers: 1					Scr Rst: Alpha: 2.63E+03 pCi/g	Beta: 7.90E+02 pCi/g	
3 GSPCR-1-AA-B J5C070000-493-BLK 	2.00g, in	UIC12573 01/31/05, pd 10/12/04, r								
03/04/2005 08:20		AmtRec:	#Containers: 1					Scr Rst: Alpha:	Beta:	
4 GSPCR-1-AC-C J5C070000-493-LCS 	2.00g, in	UISH0350 02/10/05, pd 07/23/04, r								
03/04/2005 08:20		AmtRec:	#Containers: 1					Scr Rst: Alpha:	Beta:	
Comments: <i>samples were crashed mth 3/15/05</i> <div style="text-align: center; font-size: 2em; font-weight: bold; margin-top: 10px;">PRIORITY</div>										
All Clients for Batch: 108302, FLUOR HANFORD IC Flour Hanford Inc , BG2, 50639										
GSK031AE-SAMP Constituent List: U-232 RDL: pCi/g LCL:20 UCL:105 RPD:35 U-234 RDL:1 pCi/g LCL: UCL: RPD: U-235 RDL:1 pCi/g LCL: UCL: RPD: U-238 RDL:1 pCi/g LCL: UCL: RPD:										
GSPCR1AA-BLK: U-232 RDL: pCi/g LCL:20 UCL:105 RPD:35 U-234 RDL:1 pCi/g LCL: UCL: RPD: U-235 RDL:1 pCi/g LCL: UCL: RPD: U-238 RDL:1 pCi/g LCL: UCL: RPD:										
STL Richland Key: In - Initial Amt, fi - Final Amt, di - Diluted Amt, s1 - Sep1, s2 - Sep2 Page 1 ISV - Insufficient Volume for Analysis WO Cnt: 4 Richland Wa. pd - Prep Dt, r - Reference Dt, ec-Enrichment Cell, ct-Cocktailed Added Prep_SamplePrep v4.8.08										